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**Whale Evolution (PBS)**

Search “Whale evolution” on YouTube or go to link: https://youtu.be/I2C-3PjNGok

(*Phil Gingrich searching for fossils in Pakistan).*

There is made a find most paleontologists only dream about. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that would re-write one of evolution’s greatest stories.

(*Phil Gingrich speaking.)* “I found the back of a skull that I couldn’t identify. It had a very good, well-preserved ear region and that offered the clue to what it was.” The shape was familiar but in other ways it was nothing like Gingrich had ever seen.

(*Phil Gingrich speaking.)* “This is the original specimen… There are several things that strike you. One is that it is very similar in size and shape to the back of a skull of a\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.” But there was something odd about this skull. On its underside was a walnut-sized bump

(*Phil Gingrich pointing to round protrusion from skull*.) If this wasn’t here I would think that it was an archaic carnivorous mammal, what we call a creodont - but it is here. It was part of the animal’s inner \_\_\_\_\_\_\_\_\_\_\_\_\_ and it had a distinctive shape. A shape found today only found in one kind of animal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Gingrich wondered, “Was his find a crucial missing piece?” The first fossil evidence ever found for one of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ daring claims - that whales had evolved from land \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. To know for sure Gingrich would need to find more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, ones that would show each stage of the whale transformation, what scientists call \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_forms.

*Basilosaurus*, a 40 million year old creature already known to science. *Basilosaurus* lived full time in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. If whales had evolved from land animals, they had done so long before *Basilosaurus .* so Gingrich didn’t think the bones would be of much interest but he couldn’t have been more wrong. *Basilosaurus* had something modern whales have long since lost. The bones were small but unmistakable: a pelvis, a \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ ,even \_\_\_\_\_\_\_\_\_\_\_\_\_. This whale had a complete set of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ bones. It was dramatic evidence that whales had once been \_\_\_\_\_\_\_\_\_ - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ animals.

Scientists now think the earliest ancestor of whales was similar to this 15 million year old\_\_\_\_\_\_\_\_\_-like organism called *Sinonyx*, a predator which lived along the shores of an ancient sea. Perhaps its descendants found the water as source of abundant \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and a haven from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Over millions of years front legs became \_\_\_\_\_\_\_\_\_\_\_\_. Rear legs \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Body lost fur and took on their familiar streamlined shape.

Since Gingrich’s first find known as *Pakicetus* the list of transitional whales has grown. It now includes *Ambuleocetus, Rodhocetus, Dorudon, as well as Basilosaurus.* They reveal the gradual migration of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the top of the head as whales adapted to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the water.

Bones aren’t the only evidence of whale evolution. Their ancestry is also visible in the way they \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

Fish swim by flexing their spines side-to-side. But mammals swim differently. This otter swims by undulating its spine \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in exactly the same way that \_\_\_\_\_\_\_\_\_\_\_\_\_ do. And, as it turns out, in the same way \_\_\_\_\_\_\_\_\_\_\_\_\_\_ mammals use their spines when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.